CAMAR Core Platform

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***Abstract*—In this paper, we propose a software architecture for context-aware mobile augmented reality application developments in which we can utilize contextual information. In addition, we discuss how contextual information can enhance traditional AR approaches and virtual contents and the possibilities.**

***Index Terms*—Context-awareness, Mobile AR, Framework**

I. Introduction

As a concept becomes mature like Virtual Reality, ubiquitous computing, context-aware computing, relevant development tools also emerged. Meanwhile, Augmented Reality is one of promising technology to realize virtual reality systems in our daily life due to its lightness compare to VR. In ubiquitous virtual reality, we are able to interact with any relevant information or contents anytime and anywhere. As a means of realizing ubiquitous virtual reality, we try to combine context-aware mechanisms into AR framework.

In this paper, we propose Context-Aware Mobile AR Core Platform as a foundational research development tool to help AR application developers to utilize various contextual cues in their applicatons. The ultimate goal of the proposed platform is how to provide context to AR development tools. In addition, the platform supports context-aware mechanisms such as context model, selective collaboration as well as personalized augmentation.

II. CAMAR Core Platform

The proposed software architecture mainly consists of two parts: context-aware framework for a mobile user (i.e., wear-UCAM [1]), and AR application toolkit using Open Scene Graph (i.e., osgART [2]). As shown in Fig. 1, context-aware part includes a sensor interface that is a wrapper class, a service that processes contextual information and manages it. In particular, we exploit *ServiceProvider* interface to provide contextual cues to AR applications that is also an abstract class. On the other hand, AR application part is straight-forward because it only include *ServiceProvider* interface in its main rendering procedure as well as tracking procedure. Of course, we need another wrappr class for tracking module rathr than one that is provided by osgART in order to enhance image analysis-based tracking performance by using contextual cues. For example, dynamic threshold is important to recognize or track a marker regardless of lighting condition. To measure intensity of lighting, it is usually to analyze images frame by frame. However, we can directly use the intensity value if we have lighting observable sensor. This is only a simple example to show usefulness of the proposed software architecture.

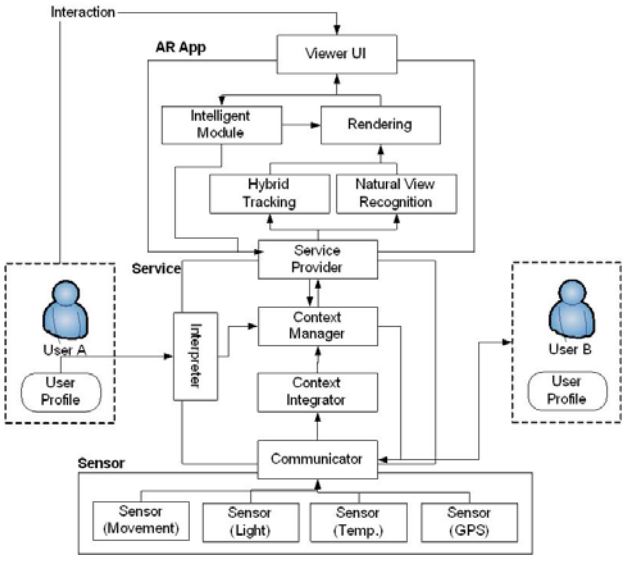

Fig. 1. CAMAR Core Platform Structure and Context Flows

III. Discussion and Future Work

In this paper, we proposed CAMAR Core Platform that can help AR application developers to utilize contextual information easily into their application. In order to show feasiblity of the proposed architecture, however, we should consider the followings: how many types of sensors and how many sensors we can support, the performance of context processing from sensors to applicatons because most AR applications require intensive image processing, performance of tracking markers, and improvemet of rendering. As future works, we will evaluate the proposed software architecture and implement pragmatic application by using the proposed library.

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[2] http://www.artoolworks.com/community/osgart/